

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the reasons that follow.

Claims 1-18 are currently pending in this application. Claims 11-18 were previously withdrawn in response to a restriction requirement.

Allowable Subject Matter

Claims 7-10 have been allowed in the referenced Office Action. The Applicant thanks Examiner for the indication of allowable subject matter.

Claim Rejections Under 35 U.S.C. §102

Independent claims 1 and 4 stand rejected under 35 U.S.C. 102 (e) as being anticipated by U.S. Patent No. 6,672,697 to Haflinger (Haflinger). Applicant respectfully traverses the rejection, because Haflinger fails to teach each and every element of Applicant's claimed invention.

Applicant's invention relates to apparatus and methods for performing processes on print data, such as striping, staggering, and stitching, prior to printing by a multi-head printer. Multi-head printers use multiple smaller print heads rather than a single larger print head for cost and reliability reasons. Data to be printed is divided into multiple portions, referred to as "stripes," each of which is printed by a respective one of the multiple print heads. Beneficially, subsets of the print data can be stored in multiple stages of buffers and processed in parallel to increase processing efficiency.

The multiple print heads can be aligned in a cross-web direction and physically staggered in a down-web direction. (See FIG. 3). Special processing ensures that print data is provided to the print heads over time, in such a manner that each resulting line of pixels is printed on a single (cross-web) line on the output medium. (Par. 0088). Namely, the print data can be staggered,

such that the data is provided to the print heads in a sequence that takes into account physical staggering of the print heads in a down-web direction. (Par. 0087). In some instances, null data is stored in some of the print buffers to account for the beginning of an output medium not yet being under the related print heads. (Par. 0094).

Applicant's invention as set forth in independent claim 1 recites "(2) providing the subset of the print data to the print head if it is determined that the print head should print the subset of the print data; and (3) otherwise, providing a predetermined data set to the print head." The predetermined data set may be null data or preheat data. Print quality may be improved by providing some data, whether it be actual print data or null data to the print heads at all time during printing. (Par. 105).

Haflinger describes dithering printed pixels by assigning some pixels in a raster line to nozzles that are on one print head, and the rest to a nozzles on another print head. (Col. 6, lines 58-61). Haflinger further describes that the firing of each print nozzle is controlled by an independent signal from the control circuitry so that each of the print nozzles may be controlled separately. (Col. 8, lines 16-19). Thus, Haflinger controls whether individual nozzles of a print head are used in printing a given pixel of an image by assignment of the nozzle to the respective pixel and/or by an independent nozzle control signal.

Haflinger fails to disclose, teach, or suggest at least "providing a predetermined data set to the print head," as recited in Applicant's claim 1. There would be no apparent need for providing a predetermined data set to the print head in Haflinger, since each of the individual nozzles can be independently controlled. Thus, rather than supplying null data to prevent a print head from printing before the beginning of the output medium passes under the print head, Haflinger can inhibit firing of print head nozzles using the independent control circuitry. Haflinger does not anticipate claim 1, because it fails to teach each and every limitation of the claim.

Independent claim 4 recites similar limitations as claim 1 and is allowable for same reasons. Applicant respectfully request that the rejection of each of these independent claims be withdrawn.

Claim Rejections Under 35 U.S.C. §103

Dependent claims 2 and 5 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Haflinger in view of U.S. Patent Application Publication No. 2004/0119767 to Takekoshi et al. (Takekoshi et al.). Applicant respectfully traverses this rejection, because the combination of Haflinger and Takekoshi et al. fails to disclose, teach, or suggest each and every element of Applicant's claimed invention.

Turning briefly to the cited reference, Takekoshi et al. describes changing a dot pattern of an ink jet printer for each page so as to make a "use frequency" of all the nozzles of the print head uniform as the number of pages increases. (Page 8, paragraph 118). In particular, "null data (that does not cause any ink to be ejected) is added as image data for the upper two of the 1,280 nozzles of the print head." (Par. 0129). Consequently, Takekoshi et al. describes that "the image data is shifted downward by an amount corresponding to the additional two nozzles." (Id.) Such a technique can be useful in prolonging the life of the print head, by ensuring that use of each of the nozzles of a print head is distributed among the different nozzles of the print head.

As an initial matter, there is no motivation to combine Takekoshi et al. with Haflinger as suggested by the Examiner. The Examiner suggests motivation to combine the references would have been "to inform the print head to not perform any printing functions." (Office Action, page 4, last sentence of par. 5). To the contrary, Takekoshi et al. only uses null data within image data when the print head is performing printing functions. The null data is used to redistribute active nozzles on subsequent pages, thereby making the use frequency of all the nozzles of the print head uniform. Thus, there would be no motivation to use the step of providing null data to the print head if the print head is not performing any printing functions as suggested by the Examiner. Takekoshi et al. describes adding null data as image data, when the

print head will be printing an image to ensure a uniform use frequency for all the nozzles of the print head.

Even if the references were combined as suggested by the Examiner, the combination of Haflinger and Takekoshi et al. does not disclose, teach, or suggest at least “(2) providing the subset of the print data to the print head if it is determined that the print head should print the subset of the print data; and (3) otherwise, providing a predetermined data set to the print head,” wherein the step of providing a predetermined data set to the print head comprises “providing null data to the print head,” as claimed.

Dependent claim 2 depends from independent claim 1, incorporating all of the limitations of claim 1. Similarly, dependent claim 5 depends from independent claim 4, incorporating all of the limitations of claim 4. Accordingly, each of claims 2 and 5 are patentably distinguishable over Haflinger for at least those reasons provided above with respect to claims 1 and 4.

Further, neither of the references discloses, teaches, or suggests determining whether a subset of the print data should be provided to the print head, and otherwise providing null data to the print head, as claimed. Takekoshi et al. describes the addition of null data to image data to change positions of the operated nozzles of the print head to make the use frequency of all the nozzles of the print head uniform. Applicant submits that adding null data to a portion of image data (e.g., the upper two nozzles of 1,280 nozzles) for the print head is different than providing null data to the print head in place of print data. Since the null data described by Takekoshi et al. applies to a subset of the available nozzles of a print head, the print head continues to receive image data that is not null data (e.g., the bottom 1278 nozzles of the print head).

Applicant respectfully request that the rejection of each of these dependent claims be withdrawn.

Independent claim 4 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Haflinger. Applicant respectfully traverses the rejection, because Haflinger fails to teach each and every element of Applicant's claimed invention as argued above.

Applicant respectfully request that the rejection of independent claim 4 be withdrawn.

Dependent claims 3 and 6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Haflinger in view of U.S. Patent Application Publication No. 2002/0057306 to McDonald. (McDonald). Applicant respectfully traverses this rejection, because the combination of Haflinger and McDonald fails to teach each and every element of Applicant's claimed invention.

Dependent claims 3 and 6 respectively depend from independent claims 1 and 4 and incorporate all of the limitations of the respective base claim, and therefore are patentably distinguishable over Haflinger for at least those reasons provided above with respect to claims 1 and 4.

McDonald describes an ink jet temperature regulation controller that includes a head temperature sampler (HTS) and a preheat data generator (PDG). The PDG circuit translates head temperature data into a data type appropriate for a preheat delivery unit (PDU). Preheat data is updated responsive to monitoring provided by the temperature sampler (see FIG. 6, Step 612).

McDonald does not disclose, teach, or suggest "providing the subset of the print data to the print head if it is determined that the print head should print the subset of the print data" and "otherwise, providing a predetermined data set to the print head" wherein the predetermined data is preheat as claimed.

Thus, McDonald considered alone or in combination with Haflinger fails to cure the defect of Haflinger. Applicant respectfully requests that the rejection of these dependent claims be withdrawn.

Applicant believes that the present application is in condition for allowance. Favorable reconsideration of the application is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

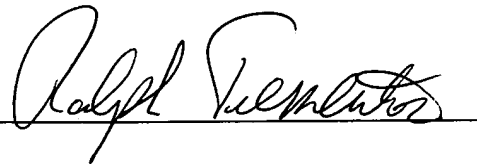
The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-3431. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-3431. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-3431.

Respectfully submitted,

Date

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By



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